PROCEEDING

Recent research and development of functional food in Taiwan

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Abstract : As the living standard rises, people are more concerned with the health benefits of foods. Functional foods are, therefore, receiving increasing attention worldwide. The functional food market in Taiwan reached 1.78 billion US dollars in 2005. Only those which have been certified by the Department of Health can claim their health benefits. Until January 2007, only 88 functional foods have received the certificates. In addition to the product development in the food industry, research institutes and universities are also actively engaged in the technology development and basic research of functional foods. Many raw materials harvested in Taiwan, including edible plants, herbs, medicinal mushrooms, and sea foods, are investigated for their health benefits, bioactive components and suitable processing technologies. J. Med. Invest. 54 : 389-391, August, 2007

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FUNCTIONAL FOOD MARKET IN TAIWAN

Functional foods are foods which can provide additional health benefits beyond basic nutrition specially to an intended population. In developed countries, chronic and age-related diseases have become the major causes of death. Foods which can prevent or delay the onset of diseases such as cardiovascular disease, cancer, diabetes mellitus and Alzheimer's disease are therefore receiving more and more attention.

In Taiwan, the total market value of functional food reached 57 billion NT dollars (1.78 billion US dollars) in 2005. Those in the form of capsules or tablets were around 25 billion NT dollars (0.78 billion US), slightly less than those in food product form (32 billion NT, 1 billion US). There are approximately 140 domestic manufacturers, while the imported functional food products hold 39% of the total market (1).

The most popular functional foods sold in Taiwan are chicken essence, herb products, medicinal mushrooms products (*Ganoderma lucidum, Agaricus blazei, Antrodia camphorata*) in addition to dietary supplements such as multiple vitamins, calcium tablets and glucosamine.

The health issues with which Taiwanese consumers are most concerned are shown in Figure 1. Among them, prevention of heart disease, protection of liver function, control of weight, protection of kidney function and promoting the bone and joint health are the top five issues.

REGULATION OF HEALTH FOOD IN TAIWAN

In Taiwan, according to the "Health Food Control Act" launched on August 1, 1999, foods with health claims must be approved by the Department of Health based on scientific evaluations of the safety and biological activity of the products. Currently,

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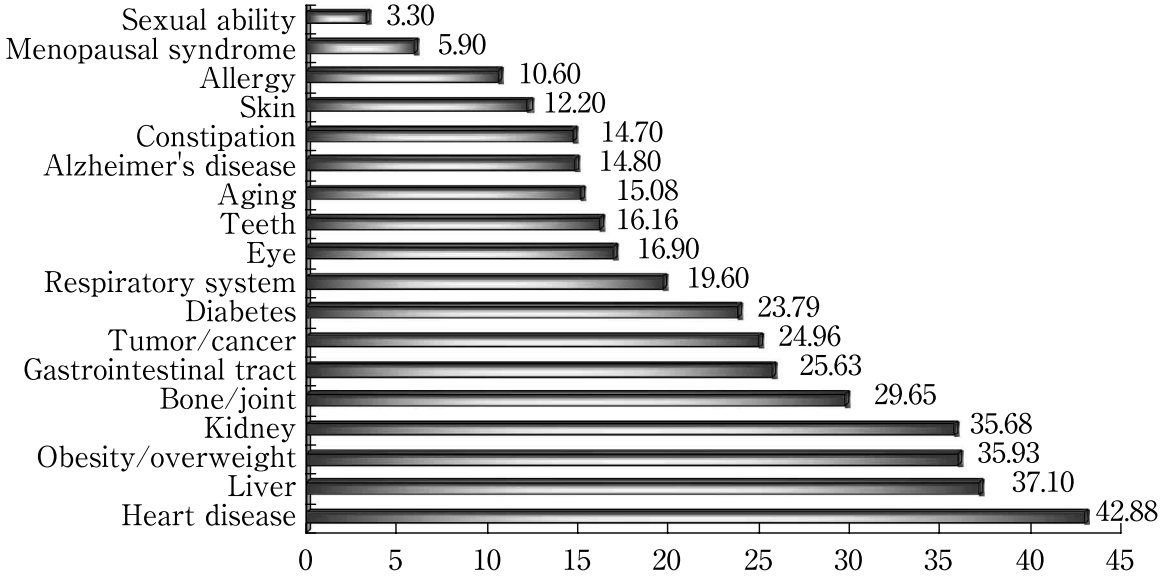

Note : Percentage calculated from multiple choices of 5 among 18 items; N=1200.
Source : Almanac of Food Consumption Survey in Taiwan, 2005.

Courtesy of FIRDI, Food Industrial Research & Development Institute

Figure 1. Top health issues of consumer concerns in Taiwan

twelve health functions can be claimed including lowering blood lipid, promoting the growth of intestinal probiotics, protecting liver function, modulating immune function, preventing osteoporosis, regulating blood sugar, maintaining dental health, anti-aging, anti-fatigue, promoting the absorption of iron, regulating blood pressure and reducing body fat.

Until January 18, 2007, only 88 health foods have been certified. The largest category is products for lowering blood lipids, which comprised 36% of the total certified health food products. Fish oil and Monascus (red koji) are the main active components of these products.

The second most popular health food function is promoting the health of gastrointestinal tract by the growth intestinal probiotics. Around 32% of the total certified health foods can claim this function. They are mainly yoghurt type of products. The main bioactives are bifido bacteria, oligosaccharides, and dietary fiber.

Protecting liver function and modulating immune function are the next two popular health functions of these certified products, which comprised 10.2% and 9.1% of the total.

The regulation of health food in Taiwan has been modified three times since its introduction in 1999. An amendment to the "Health Food Control Act" has passed by the Legislative Yuan to loosen the control of health food. A dual system for health food registration was thus set up from January 1, 2007. The first variety of health foods needed to be assessed individually and pass scientific safety and health functionality tests. The second variety of approved health food, a new category, needed only to follow the permitted health food standards announced by the government. The implementation of this new dual registration system may lead the Taiwanese health food industry into a new era. Health food production thus is expected to grow rapidly in the future.

RESEARCH ACTIVITIES ON FUNCTIONAL FOOD IN TAIWAN

Aging consists of a set of changes which render human beings to move progressively towards death. Oxidative stress is a major factor in aging. Reactive oxgen species produced by mitochondria can cause modification of DNA, lipids and proteins. During later stage of life, protein turnover can not keep up with the accumulation of damaged proteins (2). We are employing *Caenorhabdtis elegans* (3), a small soil nematode, to study the anti-aging effect of some traditional Chinese medicines (TCM).

Alzheimer's disease (AD) is the major form of

dementia. It will cause tremendous burden of a family which has AD patients. The cause of AD is related to the aggregation of neurotoxic forms of amyloid β-peptide (Aβ) which is produced by the amyloid precursor protein (APP) (4). We are investigating the effectiveness of some TCM in reducing the toxicity of Aβ.

Metabolic syndrome is a cluster of metabolic abnormalities including central obesity, hyperlipidemia, hyperinsulinemia, hypertension, increased level of LDL and decreased level of HDL. It is associated with a high incidence of cardiovascular disease and diabetes mellitus. We found that green tea supplementation can reduce the symptom of metabolic syndrome (5).

Food Industry Research and Development Institute (FIRDI) has engaged in many research activities related to functional food development. They have collected many strains of medicinal mushrooms and screened for the bioactivity and fermentation ability. Isolation of Taiwan's endemic species of probiotics, producing antioxidants from microorganisms and preparing Monascus-related products are also the research interests of FIRDI. FIRDI is helping our food industry to develop many soybean-related functional foods such as soy yoghurt, soy cheese, soygerm product, soy peptides and soy lecithins.

There are also many universities, which have food science and nutrition department, actively grouping research teams to investigate the bioactivities and bioactive compounds from raw materials available in Taiwan.

Through these research activities on functional foods in Taiwan, we hope to contribute to the health and well-being of mankind.

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